6. Wikipedia. (2015, January). Heydar Aliyev Center. Retrieved from https://en.wikipedia.org/wiki/Heydar_Aliyev_Center#cite_note-5
7. Bekiroglu, S., & Hadid, Z. (n.d.). Heydar Aliyev Center. In *Architettura.* Retrieved from http://www.archimagazine.com/aheydarali.htm

TRANSPORT INNOVATIONS

ANASTASIIA TOMAKH, student
YEKATERINA VAKULENKO, Associate Professor (Transport Technologies)
IEVGENIIA MOSHTAGH, Senior Teacher of English
O.M.Beketov National University of Urban Economy in Kharkiv

Transportation has been one of the essential components of the civil engineering profession since its early days. From time immemorial, the building of roads, bridges, pipelines, tunnels, canals, railroads, ports, and harbors has shaped the profession and defined much of its public image. As cities grew, civil engineers became involved in developing, building, and operating transit facilities, including street railways and elevated and underground systems. The role of civil engineers is providing transportation infrastructure to accommodate a growing population.

Transportation systems consist not only of the physical and organizational elements that interact with each other to produce transportation opportunities, but also of the demand that takes advantage of such opportunities to travel from one place to another, that is why development of transport infrastructure and introduction of innovative solutions in this field is considered as a substantial target in progression and reconstruction of modern cities.

The main objectives of the most important transport infrastructure projects in modern cities which are developing and being implemented at the moment are as follows:

- Radical improving transport accessibility.
- Reducing the pressure on the existing transport infrastructure by introducing new modes of transport and traffic management systems.
- Improving the environmental situation.
- Developing intelligent decision-making systems during the driving process.
- Ensuring the harmonious development of the city and the surrounding region as well as the creation "distributed" or "multi-pole" cities on the basis of existing ones.
- Introducing urban planning and technological solutions that can transform existing transport infrastructure to redundant.

However, it should be noted that the common solutions to these problems that are appropriate for all cities without exception does not exist. Moreover, a number of key areas has been identified, in which searching for new urban development and technological solutions has taken place.

French Rhône-Alpes region has introduced the concept of "multi-polar cities"

which implies that the city of the future will not develop by the traditional extensive way (growing megacities, increasing the density of the population), but by combining modern logistics and transport communications of several surrounding cities of different sizes. Thus, the city does not develop due to the absorption of new space, but as a result of increased transport accessibility and eliminating distance is a problem.

Besides, public transport development must be a priority. In developed countries, especially in Europe, there is a clear understanding of fatality of "adaptation to the car" policy, which has been dominating in urban planning since the middle of the last century. Rejection of this concept and concentration on public transport have become one of the most significant trends in the municipality over the past 15-20 years, especially in Western Europe. Due to the experience of the second half of the XX century, the development of road network is always a step behind population growth of motorization and vehicle fleet of the city. Accent is given to the revival of rail public transportation (high-speed rail). France, Germany, Belgium and others are supporting this solution in the development of their cities.

The problem of congestion on the roads, which brings huge economic damages to different countries, can be solved in three ways: the construction of new roads and parking places, public transport and the introduction of intelligent systems to monitor and control traffic. The last way is the newest, but its popularity is growing rapidly. This method stimulates the development of solutions to the problem of traffic jams by non-state companies, and the main tool in this struggle is using Big Data concept which is a set of methods and techniques for collecting and processing large volumes of traffic data in order to improve the transport system.

One of the solutions to congestion is the placement of transport and logistics infrastructure under the ground. The concept suggests that the whole transport and logistics infrastructure will be located below ground level. In the project of transformation of the Paris metropolitan area, suggested by architect Richard Rogers, a key element of the new type structures are ekofreims. This large underground structure incorporates a high-speed rail, subway, roads and different utilities.

Rogers solves several problems in a row by replacing transport to underground. Parks are created instead of roads which are improving the environment; in the exclusion zone of the former railway tracks the place for new buildings is appeared. In many modern cities the construction of underground road and rail routes is almost the only way of transport infrastructure development and achieving acceptable road implementation, because the construction of new highways in conditions of dense buildings is beside the purpose.

Rejecting vehicles which are using hydrocarbon fuel seems the most unreal idea. Currently, all the world's automakers declared the development of their own car models that use hybrid, hydrogen or electric motors. Despite of the fact that current developments in this area don`t give excellent consumer qualities and best price in comparison with simple vehicles, it is obvious that a revolution in urban transport in the process. As for today, the most promising trend in the development of urban transport is to create vehicles with electric motors. France, China and Japan have

already represented their own electric micro cars concepts.

As an example of non-fossil fuels, English town Milton-Keynes, 70 miles from London, which becomes the place of the pilot launch of the first 8 electric buses. Transport will run on the route with total length of more than 24 kilometers. A peculiarity of innovative transport is that it will be used all day, buses will not have to go to the station for charging, because they will charge wirelessly via surface induction coils built in the road. Three reels will be used for bus charging, two of them will be located on the final stop of the route, and the third one will be on the middle of the route. The government of Milton-Keynes believes that the project will decrease the amount of emissions in the city. This, in turn, will reduce air pollution.

One of the most exciting innovations in transport is an unmanned vehicle which was firstly presented to the public at the beginning of the last century. Nowadays, creating an unmanned vehicle has moved far ahead, due to the rapid development of computer technologies, improvement of various kinds of sensors, position sensors and acceleration of the process. Major automakers have already submitted a modified version of serial models, which are automatically controlled under certain conditions (usually during driving on the highway). Such cars can independently rearrange the rows, perform overtaking at speeds of 100 km/h and emergency braking.

The role and need for transportation engineering will grow in the 21st century. A growing and more affluent population will increase demands for travel and improved transportation facilities and services. There will be a need for environmentally sensitive and creative designs, ingenious management and operating strategies. There will be a need to achieve community consensus in making these a reality. Transportation engineers should be well positioned to meet these challenges. Transportation engineering in particular must provide an integrated approach that includes planning, statistics, economics, finance, public policy, operations, and management. It must provide a sense of physical, environmental, and political reality.

References

1. Kumares C. Sinha; Darcy Bullock; Chris T. Hendrickson; Herbert S. Levinson; Richard W. Lyles; A. Essam Radwan; and Zongzhi Li. Development of Transportation Engineering Research, Education, and Practice in a Changing Civil Engineering World / American Society of Civil Engineers: Journal of transportation engineering, 2002 – 350p.

2. Chase, M. J., and Hensen, P. J. Traffic control systems—Past,present, and future. J. Transp. Eng.,1990 - 717p.

ON HIGH-RISE BUILDINGS WITH STEEL-CONCRETE COMPOSITE FRAME

KATERYNA TOPORKOVA, post-graduate student
O.M. Beketov National University of Urban Economy in Kharkiv

In recent years frames application is of vital concern within architectural and construction system of high-rise buildings both in Ukraine and abroad. In particular,